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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Gee Sung Chae

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BIRCH STEWART KOLASCH & BIRCH
PO BOX 747
FALLS CHURCH, VA 22040-0747

EXAMINER

DI GRAZIO, JEANNE A

ART UNIT

PAPER NUMBER

2871

DATE MAILED: 10/12/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/028,687

Applicant(s)

CHAE, GEE SUNG

Examiner

Jeanne A. Di Grazio

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 July 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) 21 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claims

Claims 1-21 are pending per Applicant's Amendment of July 13, 2004. Claims 1, 2 and 12 have been amended. Claim 21 is new.

Priority

Priority to Korean Patent Application No. P2001-31514 (June 5, 2001) is claimed.

Election/Restrictions

Newly submitted claim 21 is directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: Claim 21 is drawn to a pixel electrode being electrically connected with a drain electrode without using a contact hole. Claims 1-20 are drawn to electrical connections with contact holes.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claim 21 is withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Claim Objections

Claim 2 (amended) is objected to because of the following informalities:

As to claim 2 (amended) the recitation **on the protective layer** is unclear and appears to contradict the independent claim from which it depends. If the protective layer covers the source electrode and data line then the source electrode cannot be connected with the data line **on** the protective layer. For examination purposes the Examiner reads the limitation as consistent with the prior art of record.

Appropriate correction is **required**.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 7, 8 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rho et al. (US 6,057,896) in view of Applicant's Admitted Prior Art (APA)(Conventional Art Figures 5 and 6D).

Per claim 1 (amended): Rho discloses a liquid crystal display and TFT substrate that, with reference to Figure 3, has the following elements: a gate electrode (20) over a substrate (10), a gate insulating film (40) entirely deposited over the substrate (10) to cover the gate electrode (20), an active layer (50) formed on the gate insulating film (40) which overlaps with

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the gate electrode (20), an ohmic contact layer (71 and 72) formed on the active layer (50), a source electrode (80) formed on the ohmic contact layer (71) a drain electrode (90) formed on the ohmic contact layer (72), the drain electrode (90) being opposed to the source electrode (80) to form a channel (Column 4, Line 55), a protective layer (100) covering the source (80) and drain (90) electrodes, a storage electrode (30) formed at a pixel cell area of a same layer as the gate electrode (20), and a pixel electrode (140) formed to oppose the storage electrode (30) having the gate insulating film (40) in between the pixel electrode (140) and the storage electrode (30), and the pixel electrode (140) being electrically connected with the drain electrode (90)(See also Detailed Description of the Embodiments at Column 5, Lines 13-16)(explaining that the pixel electrode is electrically connected to the drain electrode through the contact hole and receives the display signal from the drain electrode to drive the liquid crystal molecules).

Rho does not appear to explicitly specify **a protective layer covering said source electrode, said drain electrode and some portions of the pixel electrode.**

APA Figures 5 and 6D illustrate conventional art (conventional liquid crystal displays) in which a protective film (61) covers a source electrode (57), a drain electrode (59) and some portions of a pixel electrode (55). APA Figure 6D has the same features and teaches that “[s]uch a liquid crystal display has an increased capacitance value of a storage capacitor so as to overcome the flicker phenomenon.” (Specification [0025] page 7)(Description of the Related (conventional) Art).

APA is evidence that ordinary workers in the field of liquid crystals would have found the reason, suggestion and motivation to form the structures as illustrated in APA Figures 5 and 6D for increased capacitance to overcome the flicker phenomenon.

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Therefore, it would have been obvious to one of ordinary skill in the art of liquid crystals at the time the invention was made to modify APA in view of Rho to overcome the problem of flicker.

As to claim 2 (amended), Rho teaches that conventionally, the source electrode (90) is connected with the data line on the protective layer (not shown in Figure 3)(Column 1, Lines 35-36).

As to claim 7, Referring again to Figures 2 and 3 (same embodiment), a data line (81) is perpendicular to a gate line (21) and source (80) and data line (81) are connected.

As to claim 8, In Rho, the gate electrode (20) is a branch of the gate line (21) as shown in Figure 2 (same embodiment as Figure 3) and thus the gate electrode, gate line, and storage electrode are all formed in the same layer.

As to claim 11, The protective layer (100) comprises an organic insulating material (Column 4, Lines 56-60)(See also Column 5, Lines 1-4).

Claims 3-4, 9 and 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rho et al. (US 6,057,896) in view of Applicant's Admitted Prior Art (APA)(Conventional Art Figures 5 and 6D) and further in view of Shimada et al. (US 6,424,399 B1).

Per claims 3-4, 9 and 13-15: Rho does not appear to explicitly specify that the source and drain electrodes further comprise a buffer metal layer of molybdenum, titanium, or tantalum.

Shimada teaches and discloses an active matrix substrate and liquid crystal display in which a conventional liquid crystal device has source and drain electrodes made of titanium or

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molybdenum (Column 2, Lines 23-32). It may be presumed that the molybdenum or titanium source and drain electrodes reduce contact resistance.

Shimada is evidence that ordinary workers in the field of liquid crystals would have had the reason, suggestion, and motivation to include a source and drain electrode of molybdenum or titanium for continuity of contact hole thereby contributing to excellent image characteristics (Column 8, Lines 4-13).

Therefore, it would have been obvious to one of ordinary skill in the art of liquid crystals at the time the invention was made to modify Rho in view of Shimada for source and drain electrodes of molybdenum or titanium for continuity of contact hole thereby contributing to excellent image characteristics (Column 8, Lines 4-13).

Claims 5, 10, 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rho et al. (US 6,057,896) in view of Applicant's Admitted Prior Art (APA)(Conventional Art Figures 5 and 6D) and further in view of Jeong (US 6,137,551).

Per claims 5, 10, 16 and 17: Rho does not appear to explicitly specify that the storage electrode is made of a transparent conductive material such as indium tin oxide.

Jeong teaches and discloses a conventional liquid crystal display and conventional thin film transistor array in which a storage electrode is made of indium tin oxide (Background of the Invention at Column 2, Lines 41-44).

Jeong is evidence that ordinary workers in the field of liquid crystals would have had the reason, suggestion, and motivation to form a storage electrode of a transparent conductive

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material such as indium tin oxide for a storage capacitor having a high aspect ratio (Title, entire patent).

Therefore, it would have been obvious to one of ordinary skill in the art of liquid crystals at the time the invention was made to modify Rho in view of Jeong for a storage electrode of indium tin oxide for a storage capacitor having a high aspect ratio.

Claims 6 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rho et al. (US 6,057,896) in view of Applicant's Admitted Prior Art (APA)(Conventional Art Figures 5 and 6D) and further in view of Shimada et al. (JP-03-141325).

Per claims 6 and 18: Rho does not appear to explicitly specify that an auxiliary storage electrode is connected to the storage electrode.

Shimada teaches and discloses a liquid crystal display device and method of its formation in which an auxiliary electrode is connected to a storage capacity electrode (Patent Abstracts of Japan). The auxiliary electrode is connected to the storage capacity electrode to (1) decrease electrical resistance of the storage capacity electrode and (2) decrease the time constant of the storage capacity electrode (Abstracts). With such a connection, charging characteristics of the storage capacity are improved and contrast is also improved (Abstracts).

Shimada is evidence that ordinary workers in the field of liquid crystals would have had the reason, suggestion, and motivation to connect an auxiliary electrode to a storage electrode to (1) decrease electrical resistance of the storage capacity electrode and (2) decrease the time constant of the storage capacity electrode (Abstracts).

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Therefore, it would have been obvious to one of ordinary skill in the art of liquid crystals at the time the invention was made to modify Rho in view of Shimada to connect an auxiliary electrode to a storage electrode to (1) decrease electrical resistance of the storage capacity electrode and (2) decrease the time constant of the storage capacity electrode (Abstracts) and to thus improve charging characteristics of the storage electrode and thus improve contrast.

Claims 12, 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rho et al. (US 6,057,896) in view of Applicant's Admitted Prior Art (APA)(Conventional Art Figures 5 and 6D).

Per claim 12 (amended): Applicant's recited method steps of fabricating a liquid crystal display would have been obvious to one of ordinary skill in the art of liquid crystals at the time the invention was made in light of the device as taught and disclosed by Rho and APA Figures 5 and 6D. Specifically Rho teaches and discloses **a pixel electrode (140) formed to oppose the storage electrode (30) having the gate insulating film (40) in between the pixel electrode (140) and the storage electrode (30), and the pixel electrode (140) being electrically connected with the drain electrode (90)**(See also Detailed Description of the Embodiments at Column 5, Lines 13-16)(explaining that the pixel electrode is electrically connected to the drain electrode through the contact hole and receives the display signal from the drain electrode to drive the liquid crystal molecules).

As to claims 19 and 20, the protective layer comprises an organic insulating material (Column 4, Lines 56-60)(See also Column 5, Lines 1-4).

Response to Arguments

Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeanne A. Di Grazio whose telephone number is (571)272-2289.


The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim, can be reached on (571)272-2293. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jeanne Andrea Di Grazio
Patent Examiner
Art Unit 2871

JDG


ROBERT H. KIM
SUPERVISORY PATENT EXAMINER
ART UNIT 2800